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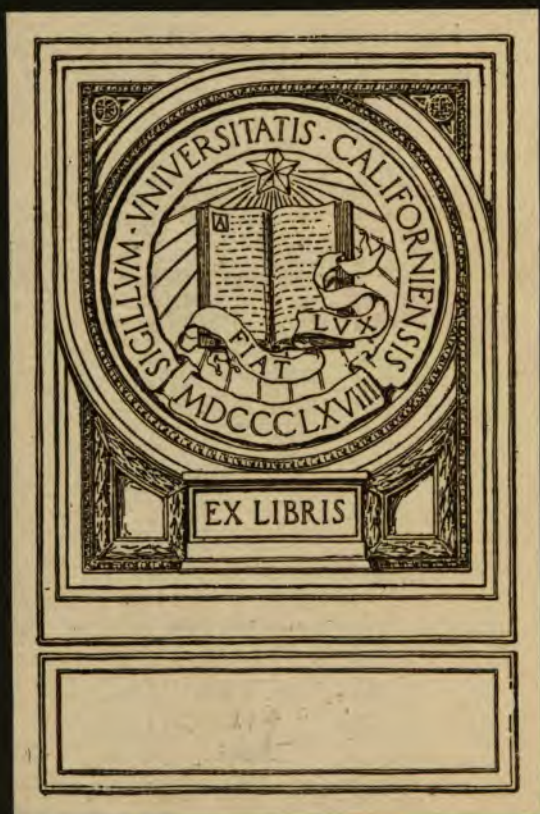
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American Society of Municipal Improvements, 1915

SPECIFICATIONS FOR Stone Block Paving

ADOPTED OCTOBER 14, 1915

These specifications will be modified from time to time to keep them fully up to date. Suggestions as to modifications or additions are solicited and should be sent to the Secretary, or to H. H. Schmidt, Chief Engineer Bureau of Highway, Brooklyn, N. Y., Chairman of the Sub-Committee on Specifications for Stone Block Paving, and—

GEORGE W. TILLSON

Boro Hall, Brooklyn, New York
Chairman of General Committee on Standard Specifications

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SPECIFICATIONS FOR STONE BLOCK PAVING.

NEW GRANITE PAVING BLOCKS.

1. The paving blocks shall be of medium grained granite, showing an even distribution of constituent minerals, of uniform quality structure and texture, without seams, scales or disintegration, free from an excess of mica or feldspar, and equal in every respect to the sample in the office of the engineer.

TESTS.

For heavy traffic the granite shall have a toughness of not less than nine (9) and a "French Co-efficient of Wear" of not less than eleven (11). For medium traffic, the granite may have a toughness of not less than seven (7) and a "French Co-efficient of Wear" of not less than eight (8) if a cement grout filler is used.

The above tests shall be made by the methods described in Bulletin No. 44, U. S. Department of Agriculture, Office of Public Roads.

The average of three (3) tests shall be used for determining toughness and the average of six (6) tests for determining the "French Co-efficient of Wear."

CERTIFICATES AND SAMPLES.

2. Contractors shall file with the engineer at or before the time of bidding, a certificate showing the name and location of the quarry from which it is proposed to obtain the blocks, also a certified copy of a report from the United States Department of Agriculture, showing the toughness and "French Co-efficient of Wear" of the granite which it is proposed to use.

On or before the date of the letting, six (6) specification blocks, made from the granite it is proposed to use, shall be filed with the engineer.

3. The blocks shall be of the following dimensions: Not less than eight (8) nor more than twelve (12) inches long on top; not less than three and one-half ($3\frac{1}{2}$) nor more than four and one-half ($4\frac{1}{2}$) inches wide on top; not less than four and three-quarters ($4\frac{3}{4}$) nor more than five and one-quarter ($5\frac{1}{4}$) inches deep.

The blocks shall be so dressed that the faces will be approximately rectangular in shape, and the ends and sides sufficiently smooth to permit the blocks to be laid with joints not exceeding one-half ($\frac{1}{2}$) inch in width at the top, and for one (1) inch downward therefrom, and not exceeding one (1) inch in width at any other part of the joint. The top surface of the block shall be so cut that there will be no depressions measuring more than three-eighths ($\frac{3}{8}$) of an inch from a straight edge laid in any direction on the top and parallel to the general surface thereof.

Care shall be exercised in handling the blocks, so that the edges and corners shall not be chipped or broken, as blocks otherwise acceptable may be rejected on account of spawling.

4. The blocks shall be sorted and laid in courses of uniform width, except in special cases, as may be ordered.

NEW SANDSTONE PAVING BLOCKS.

5. The paving blocks shall be of sound, hard sandstone, free from clay, seams, or defects which would injure them for paving purposes, of uniform quality and texture, and equal in every respect to the sample in the office of the engineer.

The blocks shall be of the following dimensions: Not less than eight (8) nor more than ten (10) inches long on top; not less than three and one-half ($3\frac{1}{2}$) nor more than six (6) inches wide on top; not less than four and three-quarters ($4\frac{3}{4}$) nor more than five and one-quarter ($5\frac{1}{4}$) inches deep.

RECUT OR REDRESSED PAVING BLOCKS.

6. When the use of blocks recut from old paving blocks is permitted, such blocks must comply with the specifications for quality of stone, as required for new blocks. The dimensions may be varied, depending upon the size of the old blocks which are to be redressed, and the character of the pavement which it is sought to obtain.

SUB-FOUNDATION.

7. Any soft or spongy material below the sub-grade, shall be replaced with sand, gravel, or other material, as directed by the engineer, and thoroly rammed or rolled. When such extra fill exceeds five (5) cubic yards, payment will be made for the excess.

Care shall be taken in excavating not to disturb the sub-foundation, except where necessary to remove the soft or spongy material.

The entire sub-foundation shall be compact and hard, and the contractor shall be required to ram or roll it thoroly with a roller satisfactory to the engineer.

CONCRETE BASE.

8. After the sub-foundation has been prepared to the satisfaction of the engineer, a concrete foundation six (6) inches thick shall be laid thereon. The concrete shall conform to the A. S. M. I. specifications for concrete for pavement foundations.

The grading and sub-foundation shall be completed at least fifty (50) feet in advance of the laying of concrete.

CUSHION COURSE.

9. On the concrete base shall be spread a layer, averaging one (1) inch in depth, of clean, coarse, dry sand, free from all gravel exceeding one-quarter ($\frac{1}{4}$) inch in size. Upon this sand bed the blocks shall be laid in courses at right angles to the line of the street, and in a straight line from curb to curb, except in special cases, when they shall be laid at such an angle as may be directed by the engineer. The blocks shall be laid as closely as possible, each block touching the adjoining one on sides and ends, and in courses of uniform width. All joints shall be broken with a lap of at least three (3) inches. The blocks shall not be laid more than twenty-five (25) feet in advance of the ramming.

FILLING JOINTS.

10. The following specifications A, B, or C, shall govern the use of —Gas-Tar Pitch (A)—Asphalt (B)—or Cement Grout (C), depending upon the kind of filler to be used in the joints:

A.—GAS-TAR PITCH FILLER.

11. Immediately after the blocks are laid, coarse, hot gravel shall be spread over the surface, and shall be swept into the joints so as to fill the space between the blocks to a depth not exceeding two (2) inches from the bottom.

The blocks shall then be rammed, to settle and compact thoroughly the gravel in the joints, and so as to leave no blocks above or below the general surface of the finished pavement.

The joints shall then be poured one-half full with the gas-tar pitch filler, hereinafter described, and shall be filled immediately to within one-half ($\frac{1}{2}$) inch of the surface with hot gravel and again poured with the filler. This last pouring shall fill the joints flush with the surface of the blocks and shall be followed immediately with a sufficient amount of hot gravel applied at the joints to cover the filler.

The gravel shall be clean, washed gravel, between one-quarter ($\frac{1}{4}$) and one-half ($\frac{1}{2}$) inch in its largest dimension.

The gas-tar pitch shall comply with the following requirements:

(a) It shall have a specific gravity between 1.23 and 1.33 at 60 degrees Fahr.

(b) It shall have a melting point between 110 and 125 degrees Fahr., determined by the cube method in water.

(c) It shall contain not less than twenty (20) per cent, nor more than thirty-five (35) per cent of free carbon insoluble in hot benzol or chloroform.

(d) It shall contain not more than one-half ($\frac{1}{2}$) per cent. of inorganic matter.

(e) It shall be free from water.

(f) It shall have a ductility of not less than sixty (60) centimeters at 77 degrees Fahr.

The gas-tar pitch filler shall be used on the work at a temperature of not less than two hundred and fifty (250) degrees Fahr. and shall at no time be heated above three hundred and twenty-five (325) degrees Fahr.

It shall be delivered where directed by the engineer at least one week before being used, to allow for examination and analysis. If shrinkage of the filler in the joints occurs, the pouring shall be continued until all joints remain permanently filled, but no flushing of the pavement will be permitted.

In applying the gravel and filler, care shall be taken that the pavers are closely followed by the filler gang, and in no case shall the paving be left over night, or when work is stopped,

without the filling of the joints being completed. In case rain stops the filler gang before its work is finished, the joints shall be protected by the use of tarpaulins, or other means to keep out water. Under no circumstances shall the filler be poured into wet joints.

B—ASPHALT FILLER.

12. Immediately after the blocks are laid, coarse hot gravel shall be spread over the surface and shall be swept into the joints so as to fill the space between the blocks to a depth not exceeding two (2) inches from the bottom.

The blocks shall then be rammed to settle and compact thoroly the gravel in the joints, and so as to leave no blocks above or below the general surface of the finished pavement.

The joints shall then be poured one-half full with the asphalt filler as hereinafter described, and shall be filled immediately to within one-half ($\frac{1}{2}$) inch of the surface with hot gravel and again poured with the filler. This last pouring shall fill the joints flush with the surface of the blocks and shall be followed immediately with a sufficient amount of hot gravel applied at the joints to cover the filler.

The gravel shall be clean, washed gravel between one-quarter ($\frac{1}{4}$) and one-half ($\frac{1}{2}$) inch in its largest dimension.

13. The filler shall be an asphaltic cement, entirely free from coal tar or any product of coal tar distillation.

It shall be waterproof, free from water or decomposition products, shall adhere firmly to the paving stones, and shall remain ductile and pliable at all climatic temperatures to which it may be subjected in actual use. It shall not run in the joints in the hottest temperature of summer, nor become hard or brittle through the action of frost.

The asphalt filler shall comply with the following requirements:

(a) It shall contain not less than 99 per cent of pure bitumen soluble in carbon bisulphide.

(b) Of the total bitumen soluble in carbon bisulphide, not less than $98\frac{1}{2}$ per cent shall be soluble in carbon tetrachloride.

(c) It shall have a penetration of not less than 13 at 32 degrees Fahr., when tested with a No. 2 needle under a load of 200 grams for 1 minute.

(d) It shall have a penetration of not more than 250 at 115 degrees Fahr., when tested with a No. 2 needle under a load of 50 grams for 5 seconds.

(e) It shall have a penetration of not less than 40 nor more than 60 at 77 degrees Fahr., when tested with a No. 2 needle under a weight of 100 grams for 5 seconds.

(f) It shall have a ductility of not less than 7 centimeters at 77 degrees Fahr., the rate of elongation being 5 centimeters per minute.

It shall be heated on the work to a temperature of not less than three hundred and seventy-five (375) degrees Fahr., nor more than four hundred and twenty-five (425) degrees Fahr., and in such quantities as will allow this temperature to be maintained in the kettle during progress of the pouring. No cement having a temperature less than three hundred and seventy-five (375) degrees Fahr., shall be used.

It shall be delivered, where directed by the engineer, at least one week before being used, to allow for examination and analysis. If shrinkage of the filler in the joints occurs, the pouring shall be continued until all joints remain permanently filled but no flushing of the pavement will be permitted.

In applying the gravel and filler, care shall be taken that the pavers are closely followed by the filler gang, and in no case shall the paving be left over night, or when work is stopped, without the filling of the joints being completed. In case rain stops the filler gang before its work is finished, the joints shall be protected by tarpaulins or other means, so as to keep out water. Under no circumstances shall the filler be poured into wet joints.

C—CEMENT GROUT FILLER.

14. Immediately after the blocks are laid, they shall be thoroly rammed and brought to an even and true surface.

15. After the pavement has been brought to a uniform surface, portland cement grout shall be poured into the joints until it appears on the surface. The grout shall be broomed into the joints, if necessary to fill the same, and the operation shall be continued as the grout settles, until the joints are thoroly filled flush with the sur-

face of the blocks. Immediately after this, the entire pavement shall be broomed to a smooth surface. The blocks shall be wetted immediately before applying the grout.

The cement grout shall be composed of one (1) part of Portland cement and one (1) part of clean sharp sand. The cement and sand shall be thoroly mixed dry and sufficient clean, fresh water shall be added to give the grout proper consistency.

The grout shall be mixed for this purpose, either in a machine mixer, to be approved by the engineer, or in a box about 4 feet 8 inches long, 30 inches wide and 14 inches deep, resting on legs of different lengths, so that the mixture will readily flow to one corner of the box, the bottom of which shall be about 3 inches above the pavement. Particular attention is called to the importance of ascertaining the proportional amount of water to be used with the mixture of different kinds of cement and sand to give the best results, and when the most advantageous proportions have been ascertained, these shall be used. While being applied to the joints the mixture in the box shall be continuously stirred. One such box shall be provided for about each ten feet in width of the roadway.

The work of filling shall be carried forward until an advance area of fifteen or twenty yards has been grouted, when the same force and appliances shall be used to regROUT the same space in a like manner.

The work shall be kept lightly sprinkled with water ahead of the sweepers, to avoid a possibility of causing the grouting to become too thick at any point. To insure the penetration of the grout into the joints of the pavement a squeegee scraper fifteen to eighteen inches in length in addition to the brooms, shall be used upon the last application of the grout.

After the grout between the joints has fully subsided and the initial set is taking place, the whole surface shall be lightly sprinkled with water and the surplus grout left on the top shall be swept into the joints, bringing them up flush and full. After the grouting is completed and a sufficient time for hardening has elapsed, so that a coating of sand will not absorb moisture from the cement mixture, one-half ($\frac{1}{2}$) inch of sand shall be spread over the whole surface. In case the work is subjected to the direct rays of the sun, an occasional sprinkling shall be given for two or three days to dampen the sand.

After the grouting is completed, the street shall be kept closed and no carting or traffic allowed on any part of the grouted pavement until at least seven days have elapsed. The surface of the pavement shall be kept moist, as may be directed by the engineer.

Should the bond between the blocks become broken before the work is accepted, the joints shall be cleaned out, even if it is necessary to take up and relay the blocks. Such defective work shall be regouted or relaid and again barricaded as previously described.

NOTE. When in the judgment of the engineer, a shallower block than that before specified is deemed desirable, a block $3\frac{3}{4}$ to $4\frac{1}{4}$ inches wide wide, $3\frac{3}{4}$ to $4\frac{1}{4}$ inches deep, and 7 to 11 inches long, may be used, provided, the granite has a sufficiently high factor of toughness and "French Co-efficient of wear."

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